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Biogenic synthesis of bi-metallic (Zn-Cu) nanoparticles by leaf extract of *Citrus limon* and evaluation of its antibiofilm activity against *E.coli*

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Nanotechnology is a rising interdisciplinary technology that has been blasting in numerous regions during the ongoing decade, be it medicine, mechanics, optics, material science, plastics or space engineering. Nanotechnology is comprehension and administration of matter at low dimensions of 1-100nm. When bulk material is broken down into nanoscopic range substance with at least one measurement i.e. length, thickness or width, then the discrete particles exhibit unforeseen properties that are completely unassociated with those of bulk material. Synthesis of nanoparticles can be carried out via physical, chemical and biological methods. Though physical and chemical methods are widely in use but in recent times, researchers give more importance to greener route of nanoparticle synthesis as it is non-polluting and also less expensive. Metal nanoparticles can be monometallic or bi-metallic. Bimetallic nanoparticles comprise two definite metals, having characteristic amalgamation and chemical chronology that give them unique geometry and specific functions. They show better stability, selectivity and catalytic activity as compared to their monometallic counterparts. Alloyed nanoparticles show increased solubility with reduced particle size thereby surpassing monometallic nanoparticles in functionality as these properties improve their optical, catalytic and electronic purpose. We carried out synthesis of bimetallic Zn-Cu nanoparticles using ethanolic extract of dry lemon leaves. Synthesized particles were then characterized using several biophysical approaches such as P-XRD, FTIR and SEM-EDX. Among all infections prevailing in surroundings percentage of UTI is 46.48% and most common bacteria causing it is *E.coli* which forms biofilm around itself and become resistant to environmental strains as well as to many antibiotics making it difficult to curb an infection. Hence, antimicrobial and antibiofilm activities of synthesized bimetallic Zn-Cu nanoparticles was checked via well diffusion and microtiter plate assay respectively. Our study gave significant results and therefore, it can be beneficial to develop nanotechnology based drugs against bacteria causing biofilm associated infections.

Key words: Nanotechnology, Bimetallic, *E.coli*, Biofilms.